Video Facilitator's Guide

Fifth Grade
Fractions in Context

Highlighted Process Standards for Mathematics

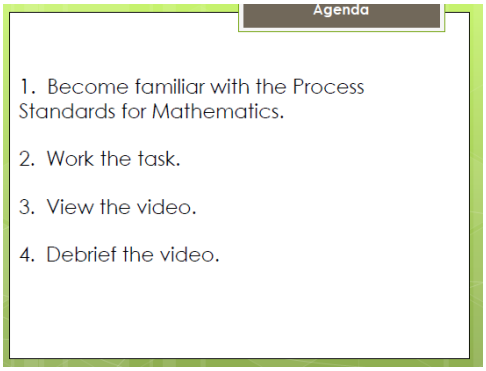
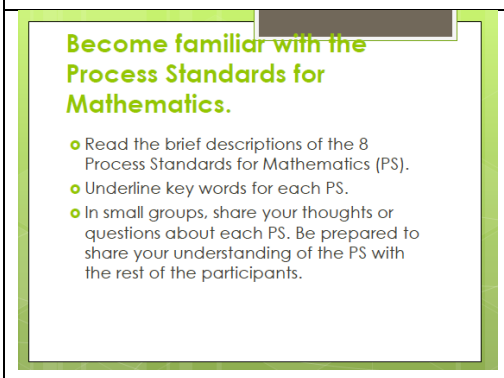
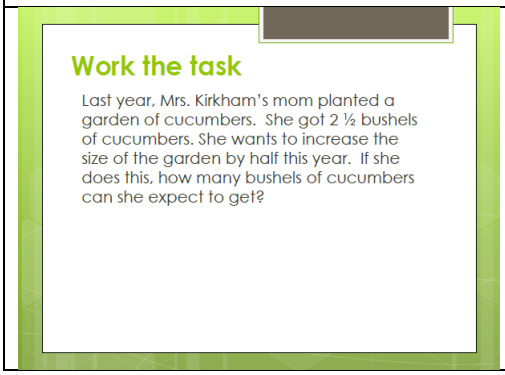
- #1 – Making sense of problems and persevere in solving them
- #2 – Reason abstractly and quantitatively.
- #3 – Construct viable arguments and critique the reasoning of others.
- #4 – Model with mathematics.
- #6 – Attend to precision.
- #7 – Look for and make use of Structure

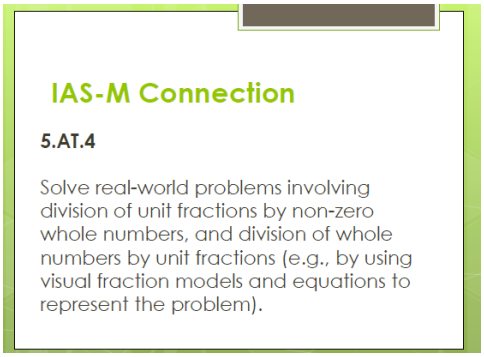
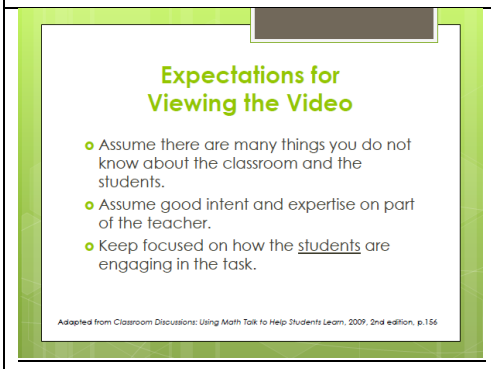
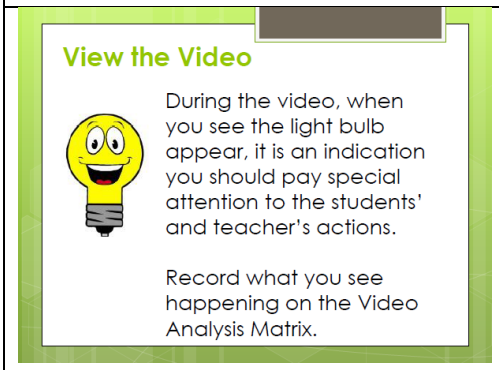
Summary of Video

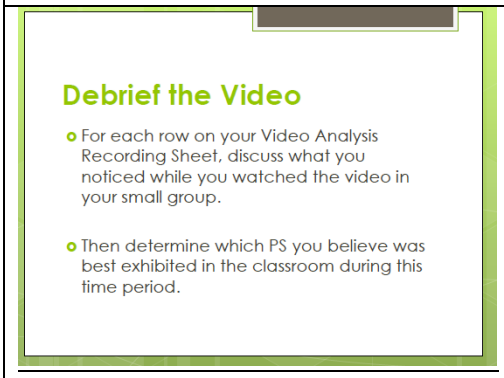
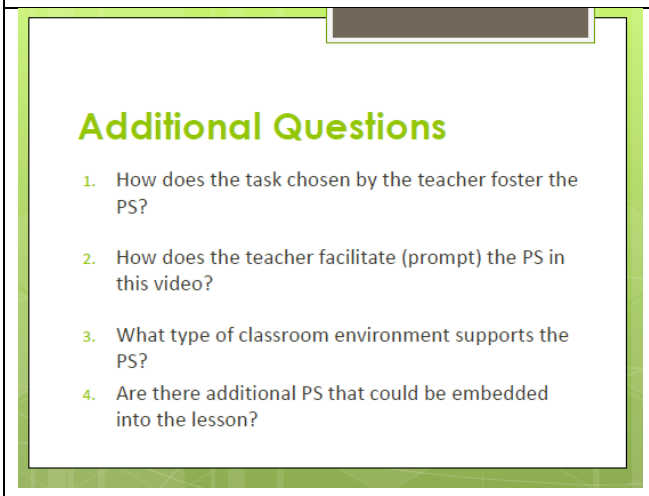
In this lesson, the teacher gives students a task to increase the size of last year's garden by half and then determine how many bushels of cucumbers the new garden would yield. The teacher uses a "poster method" whereby the students work collaboratively on a poster to draw their answers and show their work. After they have the opportunity to solve the problem, "travelers" will be assigned to visit each small group to receive that group's explanation of the answer. Once the "travelers" visit each group, they take the information back to their original group to edit or confirm their group's answer and drawing. The students have not been formally introduced to the concept of proportions. This task introduces proportional reasoning in a context that offers the opportunity to visually represent the mixed numerals in the proportion through their drawings Students reason through solving the problem rather than relying on a learned procedure.

Prepare for Facilitation

Make sure that you do the following before your presentation:
1. Read Facilitator's Guide Overview and this document that is specific to the Proportions in Context video.
2. Download the video onto desktop of computer.
3. Make copies of handouts.
4. Review the Process Standards for Mathematics.
5. Review PowerPoint slides provided.
6. Ensure that the presentation room includes appropriate audio and video equipment for showing video.

	*Agenda* Briefly share the agenda for the session. Remind participants that the purpose of this session is to introduce teachers to the Process Standards for Mathematics (PS) and observe how the SMPs are enacted in the elementary classroom.
	*Process Standards for Mathematics (PS)* Pass out handout entitled "Brief Version of Process Standards for Mathematics". Have participants read the descriptions of the eight SMPs. As they read, have them underline key words for each of the eight standards. After everyone has finished, have the participants get into small groups to share their thoughts about each PS. After sufficient time has passed, debrief the findings in whole group discussion. One way to do this would be to ask each group to share their thoughts on one PS, until all groups have shared or all PS have been discussed. As each group shares, ask for additional input from other small groups and/or add your own ideas, if necessary, to clarify the intent of each practice. Note: This step may be optional if the participants are already familiar with the SMPs or have participated in other video reviews from the *Process Standards for Mathematics in Action!* series.
	*Work the Task* Provide participants with a copy of the task. Read the word problem from the slide, and ask participants to work the task individually and without the use of an algorithm or procedure. As participants are working the task, prompt them to convince you that their solutions and procedures are correct.

	*Connect to IAS for Mathematics* Ask participants to consider the potential of this task to support the development of the skills necessary for children to meet the standard listed below: 5.AT.4 Solve real world problems involving division of unit fractions by non-zero whole numbers, and division of whole numbers by unit fractions, (e.g. by using visual fraction models and equations to represent the problem).
	*Expectations for Viewing Video* Go over the following expectations before viewing the video. 1. Assume that there are many things you do not know about the students, the classroom, and the shared history of the teacher and students on the video. 2. Assume good intent and expertise on the part of the teacher. If you cannot understand his or her actions, try to hypothesize what might have motivated him or her. 3. Keep focused on how the students are engaging in the task(s) and whether they are interacting in ways that align with the SMPs.
	*Viewing the Video* Before viewing the video, distribute the Video Analysis Matrix. Explain that when the participants notice the light bulb icon, they should begin watching for teacher and student actions that align with one or more of the mathematical practices. View the video together. You may want to pause the video briefly at the end of each time period when an icon is displayed to allow participants time to note their ideas on the Matrix. (See sample matrix in this facilitator's guide for when each time period ends.)

	*Video Debriefing:* After watching the video, ask participants to share in small groups what they noticed for each time period listed in the Video Analysis Matrix. Ask participants to add a third column to the matrix in which they identify the possible PS that are exhibited. After sufficient time has passed, ask if anyone is willing to share his/her SMP, supporting it with evidence from the video. Repeat this process for each time period. If necessary, have teachers re-watch segments of the video. Explain to the participants there may be differing opinions about which SMP is most prominent; however, each PS mentioned must be backed up by evidence from the video. If necessary, have the participants refer back to the wording of the PS to clarify its meaning. (For large groups of participants, consider the use of small-group discussion prior to whole-group discussion.) Remember that student and teacher actions may be interpreted in different ways, so there are no "right" answers, although the table does provide sample responses. The goal of documenting evidence of the SMPs is to provoke teacher reflection and discussion about the SMPs.
	If time allows, follow up the discussion of the SMPs with one or more of these questions: (Responses will vary.) 1. How does the task chosen by the teacher foster the PS? *Possible answers:* This type of task requires students to make sense of the problem situation. There is no clear solution path; so, making sense of the context is crucial to success in solving the problem. In addition, students have the opportunity to share their thinking and their approach used to solve the problem. 2. How does the teacher facilitate (or prompt) the PS in this video? *Possible answers:* The teacher asks students to verbalize their thinking, often asking students to explain or prove

	the solution they provide. In addition the teacher asks students to listen to others' explanation of alternate solution strategies and compare them to his or her own. 3. What type of classroom environment supports the PS? *Possible answers* Students work together to solve problems. Students feel comfortable sharing their work and discussing their findings. The teacher encourages students to think "outside the box."

SAMPLE COMPLETED VIDEO ANALYSIS MATRIX

Video Clue	Evidence of Student and Teacher Actions	Process Standard In Action
2:26 – 2:33  1	Teacher asks to see drawings to show their thinking. Teacher gives a problem that is relevant and applies their knowledge to a real world problem.	#2 Reason Abstractly and Quantitatively #4 Model with mathematics
4:10 – 5:30  2	Students are explaining their reasoning about the problem. Others in the group are listening to the reasoning of others and have the opportunity to ask questions about their thinking.	#3 Create viable arguments and critique the reasoning of others
6:23 – 6:47  3	The teacher does not correct the mistakes she hears. She gives other children the opportunity to hear reasoning and strengthens their ability to critique the reasoning of others	#3 Create viable arguments and critique the reasoning of others
7:20 – 7:50  4	The teacher is asking the student to make a connection between multiplication and division	#7 Make use of structure
8:10 – 9:20  5	By not allowing erasing, this gives the students the opportunity to hear the reasoning of others, thereby strengthening their ability to critique the reasoning of others.	#3 Create viable arguments and critique the reasoning of others
13:25 – 14:06  6	The teacher is asking them to clarify the difference in their thinking. This is ensuring that the students are precise in their understanding, thinking, and calculations. One student is finding ½ of a garden, the other ½ of a bushel. Which is correct?	#1 Making sense of problems #6 Attend to precision
17:21 – 17:35  7	The teacher asks students to identify the drawing as representing 2 ½ "bushels" as a label	#6 Attend to precision
19:33 – 19:50  8	The teacher is making sure students are aware of formal vocabulary	#6 Attend to precision
23:59 – end  9	The teacher is asking students to address the misconceptions and the problems that students were having with the problem. Teacher discusses the process is correct, but the calculations are incorrect	#1 Making sense of problems #6 Attend to precision